Corunna Dam Inspection Report

Dam Identification No.: 379
Hazard Potential: Significant
SE ¼ Section 21, T.7N.-R.3.E.
City of Corunna, Shiawassee County, Michigan
Located on Shiawassee River
Per Part 315, Act 451 of 1994

Prepared for:

City of Corunna
Shiawassee County Drain Commissioner
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Date of Inspection: October 20, 2005
Date of Report: November 23, 2005

Project I.D. Number 111369.05

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I. INTRODUCTION

The Corunna Dam was inspected pursuant to the requirements of Part 315, Dam Safety, Natural Resources and Environmental Protection Act, Act 451 of 1994. The Spicer Group conducted the 4-year inspection of the dam on October 20, 2005, as requested by the delegated authority of the dam, City of Corunna. The scope of this inspection is to identify conditions that constitute an existing or potential hazard to the dam. The identification of potential hazards is limited to the field visual inspection, review of previous reports, review of previous plans, and general computations. The contents of this report are not to be treated as a detailed engineering evaluation.

This inspection report will serve as a supplement to previous inspections performed on the dam. Previous inspection reports, drawings, sketches, calculations, etc. will be referred to as part of this inspection report. A summary of the design, construction, maintenance, and subsequent inspections of the dam are outlined in the Project Information section of this report.

II. CONCLUSIONS AND RECOMMENDATIONS

A. Overall Condition

Visual inspection of the dam indicates the dam and its appurtenant structures are in poor overall condition. There are enough deficiencies in the dam to warrant replacement of the dam. The dam could be restored but this would involve continual repairs every five to ten years until completely replaced. The following list is a summary of the areas of concern that were observed during the visual inspection.

B. Observed Deficiencies/Prioritized Recommendations

Specific deficiencies and recommended corrective measures, listed in order of priority, are as follows:

1. There is evidence that piping is occurring by bubbling water at the toe of the dam.

   Recommend: Major repair consisting of sheet piling or reconstruction should be completed to reduce the potential of a dam failure.

2. Displacement, spalling, deterioration, cavitation, efflorence and separation of concrete throughout the spillway

Recommend: This could be dealt with by replacing and adding concrete but again this would not be a permanent fix to the problem. Major reconstruction of a new control structure is recommended.

3. There is a great deal of seepage throughout the spillway of the dam.

Recommend: The seepage is occurring because of the poor condition of the dam. The problem could be temporarily resolved if concrete is repaired and sheet piling was used.

4. Boil areas were occurring, which is where water is traveling underneath the dam and coming up at downstream toe of dam.

Recommend: This typically means the foundation of the dam is in poor condition along water to flow in great amounts underneath the dam. Again this could be temporarily fixed but it will be a reoccurring problem unless replacement of dam occurs or significant reconstruction.

C. Further Detailed Studies and/or Investigations

At this time, we do recommend further investigation of the dam, outside of the visual inspection required every three years by an engineer and periodic inspection by the dam owner or dam operators. A structural investigation of the dam should be completed to get more information of the dam's condition.

D. Hazard Potential Classification

The hazard potential classification of the Corunna Dam is currently listed as a significant hazard potential dam. Based on our inspection, we do not recommend changing this classification.

III. PROJECT INFORMATION

A. General Description of Dam

The Corunna Dam is located in the City of Corunna, SE Quarter of section 21, T.7N.-R.3E., Shiawassee County, Michigan (See Site Location Map and Sketches in Appendix B). The dam was constructed of timber in the mid 1800's later the timber was covered in rocks and then lastly a thin layer of concrete was placed to fill in the voids. Currently, the purpose of the dam is for recreationally use. The overflow spillway is 200 foot wide with a 25 foot wide stoplog bay section. The structural height of the dam is 10 feet, the normal head is 7 feet. The impoundment has an estimated surface area of 17 acres.

B. Purpose of Dam

The original purpose of the dam was to provide power for a mill. The dam is currently used for recreational use.

C. Available Design, Construction and Maintenance Information

At the time of the inspection, all of the information regarding the construction of the dam was available. Information regarding design and construction should be on file at the City of Corunna or from the Michigan Department of Environmental Quality (MDEQ) – Dam Safety Unit.

D. Previous Inspection Reports

August 8th, 2001 MDEQ – Dam Safety Unit

Copies of these dam inspection reports and relevant information are on file with the City of Corunna and/or the Michigan Department of Environmental Quality.

IV. FIELD INSPECTION

Spicer Group performed a visual inspection of the dam on October 20, 2005. Photographs were taken and a field inspection checklist was completed in the field and office summarizing the inspection. The checklist and photographs are included in the Appendix of this report. The following is a summary of the visual observations made during the inspection:

A. Seepage, scouring, and boil areas occur throughout Principal Spillway and at the downstream face.

B. Stoplogs themselves are in good condition but the concrete by the stoplogs are in poor condition with the following occurring spalling, cracks, seepage, displacement and separation. Stoplogs are relatively new so most of the leakage occurs at the interface between the stoplogs and the concrete.

C. At the downstream side of the dam the river channel becomes wide creating a pool with natural riprap and scouring.

D. The concrete structure is in poor condition and has a lot of spalling, cavitation, seepage and cracks throughout the spillway.

E. Efforescene occurs in the concrete near the stoplogs.

V. STRUCTURAL STABILITY

The overall structural stability of the dam is in poor condition, based on visual inspection. Flow is passing through and under the dam is a sign that piping failure could occur. The structure also has many cracks and voids throughout the dam.

VI. HYDROLOGY AND HYDRAULICS

A. Available Design Data, Hydrologic Design Data provided by the MDEQ, Previous Evaluations

Hydrologic information provided by the MDEQ has been obtained and is included in the appendix of this report. The MDEQ calculated the 200-year peak inflow into Corunna Dam to be 6800 cfs.

B. Contributing Drainage Area

The area contributing to the Corunna Dam impoundment is 508 square miles.

C. Design Flood Determination

The design flood is determined by the MDEQ classification of the dam. High hazard dams are required to convey the 200-year event or maximum observed event, whichever is greater. The MDEQ determined the 100-year peak inflow into the Corunna Dam to be 6800 cfs.

D. Existing Spillway Capacity

The spillway is able to convey the 200-year peak discharge of 6800 cfs. The dam will be able to pass this flood having approximately five feet of flow over the dam.

E. Routing of Spillway Design Flood

Routing of the Spillway was not completed because it is able to pass the 200-year peak discharge.

VII. OPERATION AND MAINTENANCE

A. Assessment of Operating Equipment and Procedures

Currently there is not an O&M Plan written. It is recommended that one be made stating the procedures for upkeep and operation of the dam.

B. Evaluation of Current Maintenance Plan

A copy of the Corunna Dam Operation and Maintenance Plan can be obtained from the City of Corunna.

In addition to the items outlined in the operation and maintenance plan, all metal surfaces should be inspected on a regular basis. Sandblasting, cleaning, and painting should be performed as necessary.